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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Yong-Geun KIM

Serial No.:	08/250,770	Examiner:	D. Yockey
Filed:	27 May 1994	Art Unit:	2108
For:	METHOD AND APPARATUS FOR CONTROLLING A LIGHT SIGNAL IN ELECTROPHOTOGRAPHIC RECORDING APPARATUS		

Appeal No.________________

Do Not Enter
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9-2-97

The Honorable Commissioner
of Patents & Trademarks
Washington, D.C. 20231

ATTENTION: Board of Patent Appeals and Interferences

APPELLANT'S REPLY BRIEF (37 CFR §1.192)

Entry of the following Reply Brief in response to the Examiner's Answer (Paper No. 21), mailed 13 May 1997, is respectfully requested.

This reply brief is transmitted in triplicate (37 CFR §1.192(a)).

REPLY BRIEF

I. STATEMENT OF REAL PARTY IN INTEREST

Pursuant to 37 CFR §1.192(c)(1) the real party in interest is:

SamSung Electronics Co., Ltd.
3425 Maetan-dong, Paldal-ku,
Suwon City, Kyungki-do,
Republic of Korea

II. RELATED APPEALS AND INTERFERENCES

Pursuant to 37 CFR §1.192(c)(2), there are no appeals nor interferences known to the Appellant, the Appellant's legal representative, or the Assignee (real party of interest) which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Pending claims 1-24 have been rejected.

IV. STATUS OF AMENDMENTS AFTER FINAL

The Amendment filed 10 December 1996 has been entered. The Amendment filed 5 February 1997 has been entered.

V. SUMMARY OF THE INVENTION

Referring to Fig. 3, data transmitting unit 10 receives the video data to be printed via data bus line 2 and converts the data received into serial of video data according to the first clock signal provided via a line 52 and, by responding to the horizontal synchronization signal exhibiting a

predetermined time interval that is fed in on line 14, transmits the converted video data through line 12. A printing control unit 20 controls the mechanism required for printing the video data by means of electrical signals and provides the beam data used to switch the light generation of light source element 68 located in the beam scanning unit 30 to the light source element via a line 32 to emit light beam 90. The beam data is obtained from the chopped video data fed in via a line 102. Also the printing control unit 20 receives and processes the beam detection signals generated by the light source element through a line 34, and provides via line 14 the horizontal synchronization signal generated by processing the beam detection signals. Note that the printing control unit 20 is generally called an engine control unit. Also, for the light source element, a semiconductor laser capable of producing 0.6 milli-Watts is used.

A chopping unit 100 is preferably constructed using an logic stage such as an AND gate having one input port coupled to receive serial video data via lead 12 from data transmitting unit 10 and a second input port coupled to receive the second clock signal via lead 62; the output port of the logic stage such as an AND gate would be coupled to printing control unit 20. During operation of the chopping unit 100, the data generated by chopping the converted video data applied through lead 12 in response to the second clock signal fed in via a lead 62, is provided to lead 102 as the chopped video data. Here, the term "chopped" means that the video data is divided according to the second clock signal. This is carried out by gating of the AND gate with the second clock signal.

A clock signal generator 40 generates local, or basic, clock signals and then, applies these clock signals to a lead 42. A first divider 50 divides the basic clock signals with a certain dividing ratio and, then provides the first clock signal to lead 52. A second divider 60 divides the basic clock signal according to dividing ratio data component of the video data received via lead 2, separated

from the video data through output port 5 and fed in through a line 3 and then, provides the second clock signal on a line 62, where, the second divider 60 may have a PWM function. An output port 5 is connected between the data bus line 2 and the line 3, and stores the dividing ratio data. Here, line 2 is normally made up of sixteen bits or thirty-two bits, and line 3, eight bits. That is, the data output device 1 such as a computer connected through the line 2, provides designated dividing ratio data as a component of the video data signal transmitted via lead 2, in accordance with the selection by the user and the printing data.

After assuming that the dividing ratio data is designated via the data output device 1, referring to Figs. 4A to 4G with an illustration describing the chopping operation carried out by the chopping unit 100, a waveform of Fig. 4E is output on the output line 102 of the chopping unit 100 if an assumption that waveforms of Fig. s 4A, 4B, 4C, and 4D are output respectively on the line 42, the line 52, the line 12, and the line 62 in Fig. 3 is given. Intervals C1, C2, and C3 in the waveform of Fig. 4C are the same as those of T1, T2, and T3 in Fig. 2. Note that the number of high pulses as shown in the intervals E1, E3 in the waveform of Fig. 4E will be larger than the number of pulses in the waveform of Fig. 4C. Also, the waveform of Fig. 4E is changed to the waveform of Fig. 4G in case the waveform of Fig. 4D changes to a waveform of Fig. 4F. That is, if the frequency of the second clock signal provided by second divider 60 to line 62 is changed by a user applying video data via lead 2 containing a dividing ratio component that is greater by a factor of two than the dividing ratio that was applied to second divider 60 to produce the second clock signal with the pulse frequency shown in Fig. 4D, the frequency of the second clock signal will be correspondingly changed to provide the waveform illustrated in Fig. 4F exhibiting a pulse frequency twice that of the second clock signal waveform illustrated in Fig. 4D; concomitantly, the frequency of the chopped

video data transmitted by chopping unit 102 via line 102 also changes by a factor of two, as is illustrated by with waveform of Fig. 4G.

Accordingly, the printing control unit 20 inputs the chopped video data through the line 102 and then, printing control unit 20 outputs the beam data for switching the light source element through line 32. Here, the beam data is almost the same as that on line 102. In response to this data, light source element 68 in beam scanning unit 30 lights up to generate laser beam 90. Laser beam 90 generated by light source element 68 has a wavelength of 650 to 800 nM, generally.

Also, the faster the second clock signal operates the greater the number of chopping operations occur. As a result, the effective amount of light illuminating the photosensitive drum decreases. On the contrary, when the user designates a smaller dividing ratio data by using softwear (e.g., abstractly represented by mode selector 66) to specify the dividing ratio component of the video data transmitted via data bus 2 in order to lower the frequency of the second clock signal (i.e., to set the second frequency to a lower value), the chopped video data transmitted via line 102 has a lower pulse frequency and consequently, the amount of light emitted by source 68 increases. Accordingly, the amount of light to which each point on the photosensitive surface of the drum is exposed is increased and thus, the density of the toner is increased. In this manner, printing quality, that is, the sharpness of printed images, is determined by changing the amount of toner attached during the developing process according to the change in the amount of light emitted by light source 68 of beam scanning unit 30, and thus, the amount of light illuminating the exterior circumferential surface of the photosensitive drum. See page 11, lin 1 through page 14, line 11.

VI. ISSUES

The Issues are described by the Examiner as follows:

1) Whether Figs. 2A-2D are "prior art"; and

2) Whether claims 1-24 are patentable under 35 U.S.C. §103 over Figs. 1, and 2A-2D of the present application in view of Tomita *et al.* 4,918,462 and Hayashi *et al.* 4,989,039.

VII. GROUPING OF CLAIMS

Claims 1, 5, 7 and 11 stand or fall alone. Claims 2-4, 6, 9 12-15 and 24 stand or fall with claim 1. Claims 8, 10 and 17-22 stand or fall with claim 7. Claim 16 stands or falls with claim 5.

VIII. ARGUMENT

1. Figs. 2A-2D are not "prior art".

The issue is deemed mute since the Examiner has not positively applied the teachings of Figs. 2A-2D against the claims. Additionally, Figs. 2A-2D are the result of the Appellant's own work using the "Prior Art" device of Fig. 1. Accordingly, Figs. 2A-2D are not prior art because, as evidenced from the Declaration/Oath, the Appellant is a citizen of Korea, and, as such, performed the work on the device of Fig. 1 in Korea in order to obtain the results depicted in Figs. 2A-2B. Therefore, since there is no showing that Figs. 2A-2D were known to anyone other than the Appellant *in this country* nor is there a showing that Figs. 2A-2D were *patented or published in this country or a foreign country*, then Figs. 2A-2D can not be deemed to be "Prior Art". Further, the specification, page 9, lines 1-8, only assumes that Fig. 2A is the output of clock generator 40. Accordingly, the assumption must carry forward to the signals of Figs. 2B-2D, since these signals are based on the initial assumption regarding Fig. 2A. Therefore, Figs. 2A-2D are not "prior art".

2. Claims 1-24 are patentable under 35 U.S.C. §103 over Figs. 1, and 2A-2D of the present application in view of Tomita *et al.* 4,918,462 and Hayashi *et al.* 4,989,039.

In response to the Appellant's argument, page 14, line 15 through page 15, line 1, that "if one of ordinary skill in the art had found Prior Art Fig. 1's ability to form an image with satisfactory tonal rendition due to changes in environmental conditions to be deficient and then looked to Hayashi to solve the problem, there is still no *prima facie* basis supporting the Examiner's suggestion of looking to Tomita for a solution of the problem, since the ***supposed*** problem would already have been solved by the combination of Prior Art Fig. 1 and Hayashi. The Examiner has not indicated why one of ordinary skill in the art would have found it necessary to apply the teaching of Tomita

other than a hindsight basis of needing a teaching of a *chopping means* in order to reject the pending claims", the Examiner raises a new point of argument or a shift in position on page by stating:

> ...it is noted that Tomita is applied to avoid variation of laser beam intensity. Both the Tomita and Hayashi apparatus change power of a light source, where Tomita changes the power level by chopping pulses and Hayashi changes power level by changing applied current. Thus, the two power sources are clearly equivalent for changing a power level of a light beam in a recording apparatus, each possessing its own advantages which are readily apparent to those of ordinary skill in the art; e.g. pulse width modulation techniques such as chopping pulses to change power level do not cause difficulty obtaining linear reproduction and intensity modulation techniques such as changing applied current forms images of constant resolution.

The foregoing new point of argument is apparent based on the Examiner's new point of argument on page 6, lines 10-11, that states:

> Hayashi et al. '039 teaches varying intensity of a laser beam to vary power.

And, then the Examiner's new point of argument on page 6, lines 14-19 which state:

> The reason for the combination is to enable change of power level of the admitted prior art light source in accordance with changes in environmental conditions, thereby facilitating provision of an image forming apparatus capable of forming an image with satisfactory tonal rendition regardless of changes in environmental conditions as suggested by Hayashi et al. '039, while avoiding variation in intensity of the laser beam.

Tomita, however, is silent with regard to any teaching of avoiding variation of laser beam intensity. Tomita has one purpose, and that is to compensate for the different characteristics of each element of the LED array wherin the device is capable of reducing the difference in density of the dots shapes generated by each element.

In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)

> One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

In another new point of argument the Examiner states:

> At page 15, lines 12-17 of the brief, Appellant argues that the combination fails to teach or suggest mode selecting means enabling a user to change a characteristic of said second clock signal. In response, it is noted that the claimed "mode selecting means" corresponds to an input to a divider which accepts a signal from a data output device which accepts user selections, and equivalent structare thereto in accordance with 35 U.S.C. § 112, sixth paragraph. The divider divides an applied clock signal and generates a particular frequency signal depending on the signal from the data output device applied to the input, the applied signal being disclosed as a "dividing ratio component"; this dividing ratio component is disclosed in Appellants specification simply as being provided by a data output device "in accordance with the selection by the user and the printing data"; see page 12, line 3 through page 13, line I 1. In the combination, Hayashi suggests data and signals may be provided in accordance with user selection at column 3, lines 25-35 and the Tomita structure, particularly including the dividers and pulse selection circuit which generates a selectable frequency output depending on a pulse selection signal, is equivalent to the divider with selectable frequency output. Thus, the Tomita structure in combination, which is capable of receiving signals in accordance with user selection, is deemed to be equivalent to the claimed mode selection means.

Deficiencies in the factual basis cannot be supplied by resorting to speculation or unsupported generalities. *In re Warner*, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967) and *In re Freed*, 425 F.2d 785, 165 USPQ 570 (CCPA 1970). It is again noted here that Tomita's device is for compensating for the different characteristics of each element of the LED array. In order to make the necessary compenations, a central processing unit is provided and the data necessary for providing the "second clock signal" is stored in the CPU. Any user alterations of the second clock signal will result in a change in the second clock signal and Tomita's device will no longer be able to function as intended.

In yet another new point of argument, the Examiner states:

> At page 15, line 18 through page 16, line 5 of the brief, Appellant argues that the combination fails to teach or suggest second means for generating said second clock signal by dividing said local clock signal in response to a dividing ratio component accompanying said input data. In response, the Tomita structure in the combination is clearly a second means for generating said second clock signal by dividing said local clock signal in response to a dividing ratio component, wherein Tomita clock 11 generates the second clock signal and dividers and pulse generating circuit generate a divided signal in accordance with a dividing ratio component, and wherein the pulse selection signal is the dividing ratio component. Further, the pulse selection signal which is suggested as being provided in accordance with environmental conditions at the time data is applied to the combination is deemed to accompany the data and to be a component of the input data. Thus, the combination does suggest second means for generating said second clock signal by dividing said local clock signal in response to a dividing ratio component accompanying said input data.

It is again noted here that Tomita's device is for compensating for the different characteristics of each element of the LED array. In order to make the necessary compenations, a central processing unit is provided and the data necessary for providing the "second clock signal" is stored in the CPU. Accordingly, there would be no tenable reason for providing a dividing ratio component with the input data, and neither Prior Art Fig. 1 not Hayashi teach or suggest s dividing ratio component accomanying the input data. Further, even if the pulse selection signal was suggested as being provided in accordance with environmental conditions at the time data is applied to the proposed combination of references, there is nothing is any of the applied references which remotely teaches or suggests that dividing ratio data be a component of the input data.

Finally, in a further new point of argument, the Examiner states:

> At page 16, line 6-12 of the brief, Appellant argues that none of the applied references teach or suggest converting data into a series of pulses exhibiting a pulse frequency corresponding to the frequency of the second clock signal. Contrary to Appellants' position, Tomita clearly converts data from shift register 4 into a series of pulses exhibiting a pulse frequency corresponding to the frequency of the clock signal provided by the pulse signal selection circuit, which, in the Combination, is the second clock signal.

Note, however that lines 6-12 also included the argumentment that Claim 11 calls for "a component of said input data specifying a dividing ratio" and "means for setting a frequency exhibited by said second clock signal in dependence upon said component". It is tyhe whole of claim 11 which must be considered, not just a fraction or the gist of the invention claimed.

For the foregoing reasons it is deemed that there is no tenable motivation for combining Appellant's Prior Art Figs. 1 and 2A-2D, Tomita and Hayashi as proposed by the rejection. Accordingly, the rejection is deemed to be in error and should not be sustained.

Respectfully submitted,

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IX. APPENDIX

Claims 1-3 and 6-24 are presented as finally rejected. Claim 5 is presented as amended on 5 February 1997, such amendment having not yet been considered.

CLAIMS UNDER APPEAL

1. An electrophotographic developing type reproduction apparatus, comprising:

data transmitting means for generating converted data by converting input data, to be printed as video data, in accordance with a first clock signal, and for transmitting the converted data in response to a horizontal synchronization signal exhibiting a predetermined time interval;

chopping means for providing chopped data by dividing the converted data from said data transmitting means in accordance with a second clock signal; and

printing control means for providing beam data in response to said chopped data, for controlling printing of the video data by generating electrical signals to control generation of a laser beam by a light source element;

said print control means generating said horizontal synchronization signal in correspondence with a beam detection signal derived from the laser beam by the light source element.

2. The electrophotographic developing type reproduction apparatus of claim 1, further comprised of the second clock signal having a frequency greater than the first clock signal.

3. The electrophotographic developing type reproduction apparatus of claim 1, further comprised of a frequency of the second clock signal being an integer multiple of a frequency of the first clock signal.

4. The electrophotographic developing type reproduction apparatus of in claim 1, further comprised of said chopping means comprising an AND gate having a first input port coupled to receive said converted data and a second input port coupled to receive said second clock signal.

5. The electrophotographic developing type reproduction apparatus of claim 1, further comprised of mode selecting means for enabling a user to change a characteristic of said second clock signal.

6. The electrophotographic developing type reproduction apparatus of claim 1, further comprised of a semiconductor laser device serving as the source element.

7. The electrophotographic developing type reproduction apparatus of claim 1, comprised of:

first means for generating a local clock signal; and

second means for generating said second clock signal by dividing said local clock signal in response to a dividing ratio component accompanying said input data.

8. The electrophotographic developing type reproduction apparatus of claim 1, comprised of:

means for generating a local clock signal;

first means for generating said first clock signal by dividing said local clock signal; and

second means for generating said second clock signal by dividing said local clock signal in dependence upon a dividing ratio component of said input data.

9. The electrophotographic developing type reproduction apparatus of claim 1, comprised of said chopping means intermittently transmitting said serial video data during pulses of said second clock signal.

10. The electrophotographic developing type reproduction apparatus of claim 1, comprised of:

a component of said input data specifying a dividing ratio; and

means for setting a frequency exhibited by said second clock signal in dependence upon said component.

11. The electrophotographic developing type reproduction apparatus of claim 1, comprising:

a component of said input data specifying a dividing ratio;

means for setting a frequency exhibited by said second clock signal in dependence upon said component; and

said chopping means dividing said converted data into a series of pulses exhibiting a pulse frequency corresponding to said frequency exhibited by said second clock signal.

12. A method for controlling a laser signal in an electrophotographic developing type reproduction apparatus, said method comprising the steps of:

generating converted data by converting input data to be printed into video data, in accordance with a first clock signal, and for transmitting the converted video data in response to a horizontal synchronization signal exhibiting a predetermined time interval;

generating chopped data by dividing the converted data in dependence upon a second clock signal;

supplying beam data for controlling generation of said laser signal by a light source element in response to said chopped data; and

generating said horizontal synchronization signal in dependence upon a beam detection signal obtained by detecting said laser signal.

13. The method of claim 12, comprising the second clock signal having a frequency higher than the first clock signal.

14. The method of claim 12, comprising a frequency of the second clock signal being an integer multiple of a frequency of the first clock signal.

15. The method of claim 12, comprised of generating the chopped data by applying the converted data to a first input port of an AND gate data and applying the second clock signal to a second input port of the AND gate.

16. The method of claim 15, comprised of changing a characteristic of the second clock signal in response to a selection made by a user of the reproduction apparatus.

17. An apparatus for printing video data, comprising:

data bus means having a first data line for providing input video data and a second data line for providing dividing ratio data;

clock signal generating means for generating a first clock signal and for generating a second clock signal, said second clock signal exhibiting a characteristic depending upon said dividing ratio data;

data transmitting means for converting said input video data into serial video data in response to said first clock signal, and for transmitting said serial video data in response to a horizontal synchronization signal;

logic means for providing chopped video data in dependance upon said serial video data and said second clock signal;

printing control means for generating beam data in response to said chopped video data; and

beam scanning means for providing a laser beam for defining images corresponding to said beam data;

said beam scanning means generating a beam detection signal derived from scanning of said laser beam;

said printing control means generating said horizontal synchronizing signal in dependence upon said beam detection signal.

18. The apparatus of claim 17, comprised of generating said first clock signal with a frequency less than said second clock signal.

19. The apparatus of claim 17, comprised of generating said first clock signal with a frequency equal to said second clock signal.

20. The apparatus of claim 17, comprised of said clock signal generating means comprising means for changing said characteristic of said second clock signal in correspondence with changes in said dividing ratio data.

21. The apparatus of claim 17, comprised of said clock signal generating means comprising:

first means for generating a local clock signal; and

second means for generating said second clock signal by dividing a frequency of said local clock signal in dependence upon said dividing ratio data.

22. The apparatus of claim 17, comprised of said clock signal generating means comprising:

means for generating a local clock signal exhibiting a first plurality of pulses characterized by a local frequency;

first means for generating said first clock signal by dividing pulses of said local clock signal to provide a second plurality of pulses characterized by a second frequency; and

second means for generating said second clock signal by dividing said pulses of said local clock signal in dependence upon said dividing ratio data, to provide a third plurality of pulses characterized by a third frequency established in dependence upon said dividing ratio data.

23. An apparatus for printing video data, comprising:

data bus means having a first data line for providing input video data and a second data line for providing dividing ratio data;

clock signal generating means for generating a first clock signal and for generating a second clock signal, said second clock signal exhibiting a characteristic depending upon said dividing ratio data, said clock signal generating means comprising:

means for generating a local clock signal exhibiting a first plurality of pulses characterized by a local frequency;

first means for generating said first clock signal by dividing pulses of said local clock signal to provide a second plurality of pulses characterized by a second frequency; and

second means for generating said second clock signal by dividing said pulses of said local clock signal in dependence upon said dividing ratio data, to provide a third plurality of pulses characterized by a third frequency established in dependence upon said dividing ratio data;

data transmitting means for converting said input video data into serial video data in response to said first clock signal, and for transmitting said serial video data in response to a horizontal synchronization signal;

logic means for providing chopped video data in dependance upon said serial video data and said second clock signal;

printing control means for generating beam data in response to said chopped video data; and

beam scanning means for providing a laser beam for defining images corresponding to said beam data and for generating a beam detection signal derived from scanning of said laser beam;

said printing control means generating said horizontal synchronizing signal in dependence upon said beam detection signal.

24. A method for controlling a laser signal in an electrophotographic developing type reproduction apparatus, said method comprising the steps of:

generating converted data by converting input data to be printed into video data, in accordance with a first clock signal, and for transmitting the converted video data in response to a horizontal synchronization signal exhibiting a predetermined time interval;

generating chopped data by dividing the converted data in dependence upon a second clock signal, the second clock signal having a frequency higher than the first clock signal wherein the second clock signal being an integer multiple of a frequency of the first clock signal, the chopped data being generated by applying the converted data to a first input port of an AND gate data and applying the second clock signal to a second input port of the AND gate, said chapped data being output from an output port of said AND gate;

changing a characteristic of the second clock signal in response to a selection made by a user of the reproduction apparatus;

supplying beam data for controlling generation of said laser signal by a light source element in response to said chopped data; and

generating said horizontal synchronization signal in dependence upon a beam detection signal obtained from said laser signal.